

“The Jevons Paradox” should be important to the advocates of the coming effects of the peaking of natural and oil production and of general sustainability. Those who claim that The Jevons Paradox is valid in identifying a particular pattern of economic behavior use its 'observations' as support against energy efficiency in the use of fossil fuels. Thereby it also is used against proposals to reduce and reverse human contributions to the global warming process. The conventional economic wisdom associated with The Jevons Paradox declares that efficiency strategies produce contradictory results and asserts that market based “solutions” will always be the best solutions. This use of neo-classical economics adds additional obstacles by reducing environmental, geological, and engineering problems into conventional economic wisdom.

Neo-classical economic wisdom has two strategic advantages of being both counter intuitive and financially well supported. A third advantage is that most of its critics are by aversion ill prepared to respond to its evidence or theoretical models. Examining Jevons's paradox will lead at least to the conclusion that economics as a field of interest should not be abandoned to the practitioners of predatory economism. There will also be reasons enough to question the nature of an anti-inductive approach to social science and the too often faith based nature of cultural critiques both resisting and favoring societal change.

A further reason to examine this use of free market economics is that our economic systems are largely centralized and sustained by fossil fuels. Understanding Jevons's paradox is thereby pivotal to the restructuring of our economic practices toward relocalization. Given that the majority of the remaining reserves of oil and natural gas are outside of the United States, this examination will reveal the motivations and objectives of what is applied as the basis of neo-colonial foreign policy. Examining Jevons's paradox will lead us straight into our current tangle of societal and cultural problems. It is effectively a cusp point of several important threads.

Jevons by Jevons

William Stanley Jevons (1835-1882) was a British economist who is noted as one of the pioneers of neoclassical economic analysis. Jevons is credited with three contributions to the history of economic ideas. The adjective "neo-classical economics" references Adam Smith, David Ricardo, and others of the 18th century as the classical "free market" economists. The current nominal "neo-liberal" economists which are dominant among mainstream academic economists and conventional policy advocates are the current heirs to the "free market" legacy.

One of Jevons's contributions was his declaration that subjective value theory is rooted in the concept of marginal utility. For Jevons, the utility or value to a consumer of an additional unit of a product is inversely related to the number of units of that product they already own, at least beyond some critical quantity. To translate this into more common terms, each additional widget or unit of something will have less value for a consumer when it is collected in a pile of like widgets and units.

His second contribution is noted as having recognized the applicability of mathematics to economics. He is acknowledged as a precursor to "modern" mathematical economics by his publication of *General Mathematical Theory of Political Economy* in 1862. In this book he outlined his marginal utility theory of value as well as asserting the mathematical nature of economics.

Jevons's third book was **The Coal Question** published in 1865 and first brought him wider public recognition. In this book he observed that the consumption of coal as a fuel did not follow the marginal utility theory of value. He declared that the increased efficiency in the production of a natural resource such as coal resulted in the increased demand for coal not a reduction in its use. Based on this he declared that that Great Britain would in time deplete its coal resources. On this point Jevons is taken as a predecessor to the those who today predict the peaking of the production and distribution of oil and natural gas. Jevons defined a causal linkage from

the improvement of the steam engine by James Watt, to its use to increase the efficiency of coal mining, to the reduction of the cost of mining coal, to the rapid increase in the market for coal, to the eventual depletion of Great Britain's coal reserves. Thereby Jevon declared that "It is wholly a confusion of ideas." This is Jevons third contribution to the history of economic ideas and what is commonly described as “The Jevons Paradox.”

The Jevons Paradox actually has two parts. First, to Jevons the effects of efficiency technologies, as they effected economic behavior related the early 19th century English coal industry, seemed contrary to his understanding of the marginal utility theory of value. His expectation was that each additional unit would have less value. Instead it seemed that the value of a unit of coal increased even if the price of that unit went down. A less simplistic interpretation would have identified coal as a commodity having strategic utility in the powering of an economy and for providing ongoing comfort. Jevon's second observation is that by the accelerating use of coal as a energy resource it would be depleted sooner. The resulting 'positive' effect is declared to be the increase in immediate profits as well as the production of new capital toward producing new products, which is a form of “trickle down” economic rationalization.

Support, Corollaries, and Presumptions

There are several contemporary examples that are applied as evidence in support of The Jevons Paradox. One is a result of the oil embargo by OPEC in October 1973 against countries that were supporting Israel's Yom Kippur War against Syria and Egypt. Even though OPEC was a marginal supplier, its embargo resulted in the cost of gasoline increasing throughout the world by real and apparent shortages. Suddenly large gas guzzling cars were avoided in favor of more energy-efficient vehicles. This conservation trend was followed by a gradual increase in the demand for fuel because driving increased and the number of cars on the road soon doubled.

Similarly, technological improvements in

refrigeration have led to more and larger refrigerators. The same tendencies are in effect within industry, independent of household consumption. The same pattern has been reflected in the past 15 or so years in the rising popularity of the super sized "McMansion" housing developments, where energy efficiency technologies have been used to control the operating costs of houses so that the square footage of the houses can be significantly increased. All are also examples of the escalation of the expectations of consumption. The conventional interpretation is that efficiency technologies often result in the expansion of consumption patterns by individuals rather than actually conserving energy. Thereby the advocates of "free market" economics argue against policies favoring efficiency and conservation.

The examples confirming The Jevons Paradox alongside the speculations of new energy technologies are frequently used to "prove" the futility of advocating increased efficiencies or of the reduction of fuel consumption. So, by applying this reasoning to energy efficiency as related to oil and natural gas use, we are told that we will actually stimulate the growth of oil and natural gas consumption and accelerate their depletion rates. Part of this economic prediction is based upon the assumption of an elasticity of demand, that there is an often latent demand that is revealed upon the drop in the cost of energy or of other commodities.

The Jevons Paradox is only a paradox relative to Jevons's own economic model. The offered amendment to the theory of marginal utility is that a change in the efficiency or expense of obtaining a product may cause changes in the price of that commodity to the consumer. This basic approach also defines the fuel used to produce a product to be a marginal cost of that production.

The issue of the depletion of a resource, including fossil fuels, has been set aside by conventional economists as a non-issue. The underlying assumption is that when a particular resource is depleted or becomes too expensive to use, then with the proper capital incentives a substitution will be found, with the intervention of capital and the magic

of the "invisible hand."

This is the "free market" replacement assumption. By extension, when a fossil fuel is depleted or becomes too expensive, then by providing subsidies and other incentives a new energy source will be created to replace the prior primary energy source. By the nature of the substitution process, fuels, even high energy fossil fuels, are regarded as no different than any other economic commodity.

This capital based replacement assumption involves a simultaneous faith in the supernatural nature of the invisible hand of the "free market" alongside presentations featuring allusions to "scientific logic." By this presumed omnipotence a natural science and engineering problem is reduced to a variable within the conventional economic analysis and thereby is by default a policy making process without considering the scientific and engineering obstacles involved. This extension is also places technology as the prophesized savior, and effectively ignores the real problems of real natural science, making conventional economics seem rather "un-natural." Ethanol, bio-diesel fuels, and nuclear energy are the current examples.

All along the way little attention is given to the actual effects of the centralized and corporatized macro economic systems, their vulnerabilities, and the collateral effects that these priorities and structures sustain. By the sheer concentrated dependency upon an unusually energy rich fossil fuel the lack of diversity alone describes the incapacity to adapt to change. These assumptions do not address the effects of the centralization of production and localization of consumption which indicate little gain of efficiency.

{ Continued in The Nature of Jevons Paradox
Part Two }

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The Nature of The Jevons Paradox: Neo-Classical Economics, Ecology and Sustainability Part One

Re-Imagining Economics